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मानक

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Mazdoor Kisan Shakti Sangathan

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Jawaharlal Nehru

“Step Out From the Old to the New”

IS 11330 (1985): Specification for Refrigeration Oil Separator [MED 3: Refrigeration and Air Conditioning]



“ज्ञान से एक नये भारत का निर्माण”

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“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”

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Indian Standard

SPECIFICATION FOR REFRIGERATION OIL SEPARATOR

1. Scope — Covers design, construction, inspection and testing of refrigeration oil separator which separates lubricating oil from refrigerant.

2. Terminology — For the purpose of this standard, following definitions shall apply.

2.1 Refrigeration Oil Separator — A self-contained unit which is fitted in the discharge line for separating lubricating oil from refrigerant in a refrigeration cycle.

2.2 Design Pressure — The pressure used in design calculations for the purpose of determining the minimum thickness of the various components/parts. It is obtained by adding a minimum of 10 percent or any other figure as may be agreed to between the purchaser and manufacturer to the maximum working pressure.

2.3 Design Temperature — The temperature used in design of the separation for determining the minimum temperature that any part of the separator is likely to attain in course of operation.

2.4 Shell Diameter — The inside diameter of the shell shall be up to 300 mm and outside diameter of the shell above 300 mm.

2.5 Shell Height — Height of the shell including dished ends/plain ends measured from outside.

2.6 Dehydration — Removal of moisture from the oil separator by baking.

3. Construction

3.1 Separator shells shall be made from steel conforming to either IS : 226-1975 'Structural steel (standard quality) (*fifth revision*)' or IS : 2062-1980 'Structural steel (fusion welding quality) (*second revision*)' or IS : 2002-1962 'Steel plates for boilers'. Separator shells with diameters up to 300 mm shall be made from steel pipe which conform to IS : 1239 (Part 1)-1979 'Mild steel tubes, tubulars and other wrought steel fittings: Part 1 Mild steel tubes (*fourth revision*)' and commercial quality pipe and separator shells with diameters more than 300 mm may be made from steel plates which conforms to IS : 226-1975. The shell thickness shall conform to 3.3 of IS : 2825-1969 'Code for unfired pressure vessels'. All welding shall be done according to IS : 2825-1969. (Preferable welding as per Table 6.1, Fig. 1 and Fig. G-15 welded branch may be followed). The shell shall be shot blasted before fabrication for refrigerant use. A cut-away of a typical oil separator is shown in Fig. 1 for illustration purposes.

3.2 Domed Ends — Domed ends shall conform to 3.4.5 and 3.4.6 of IS : 2825-1969 (Torispherical).

3.3 Baffles — Baffles shall be made of steel conforming to IS : 226-1975.

3.4 Scrubber — Pad shall be made of stainless steel interlocking wire, mesh 100 to 150 mm thick. Expanded aluminium material may also be used for scrubber pad.

3.5 Nozzles — Nozzles shall be made of carbon steel which conforms to IS : 1239 (Part 1)-1979. Alternatively they may be also made of copper. However copper shall not be used in the case of ammonia gas.

3.6 Couplings — Couplings shall be made of forged steel conforming to Class III of IS : 1875-1978 'Carbon steel billets, blooms, slabs and bars for forgings (*fourth revision*)'.

Adopted 25 June 1985

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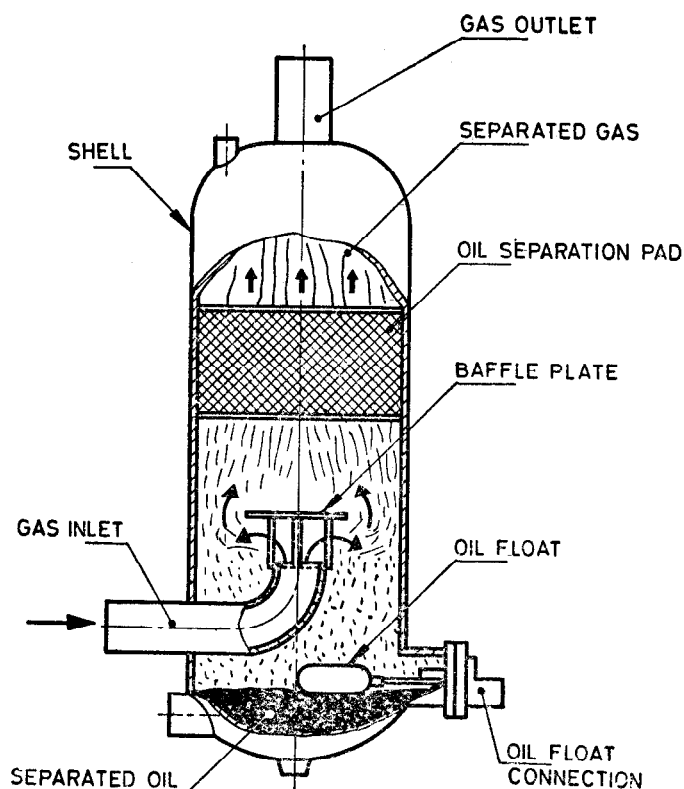


FIG. 1 CUTAWAY VIEW, OIL SEPARATOR

4. Capacity Rating — Rating of the oil separation shall be as follows:

SI No.	Maximum Compressor Displacement m ³ /h				Oil Separation, Nominal Dimension	
	High Stage		Low Stage		Shell Length, mm	Shell Dia, mm
	Ammonia	R - 12 and R - 22	Ammonia	R - 12 and R - 22		
1	125	50	135	75	560	150
2	210	93	270	135	635	200
3	545	210	765	375	915	300
4	815	365	1 275	680	1 090	400
5	1 270	550	2 040	1 020	1 270	500
6	1 870	700	2 585	1 200	1 370	610
7	3 060	1 100	3 400	1 870	1 650	760
8	4 400	2 380	4 760	3 060	1 800	915

Note — In case the suction pressure exceeds -1°C or the system cycles infrequently or the system operates constantly, the following correction factors for the maximum compressor displacement (m³/h) will be used:

- a) For high stage (ammonia) 0.91
- b) For high stage (R - 12 and R - 22) 0.80
- c) For low stage (ammonia) 0.67
- d) For low stage (R - 12 and R - 22) 0.89

5. Accessories — Following accessories shall be supplied by the manufacturer as may be agreed to by the manufacturer and the purchaser:

- a) Oil filter with gaskets and extra cartridge,
- b) Oil heater,
- c) Float valve kit,
- d) Welded neck flanges, and
- e) Safety valve.

6. Inspection and Testing

6.1 All inspection and testing shall conform to IS : 2825-1969.

6.2 General — Inspection shall be made at the various stages of construction. The manufacturer shall keep the purchaser informed of the progress of the work so that the inspection can be done at required stages.

6.3 Inspection During Manufacture — All materials to be used for pressure parts of the vessels shall be inspected before fabrication. The inspector shall ensure that all the material before use is properly identified as complying with the code and test certificates shall be produced. Stagewise inspection shall be conducted during fabrication.

6.4 Inspection of Completed Oil Separator

6.4.1 Visual inspection — During the final inspection of the whole separation, the surfaces of the welds shall be inspected visually and they shall conform to **6.7.15** of IS : 2825-1969.

6.4.2 Radiographic inspection — Welded joints shall be subjected to radiographic inspection as per **8.7** of IS : 2825-1969.

6.5 Pressure Testing — Oil separator shall be subjected to pressure to detect leakages according to **8.4** of IS : 2825-1969. The test pressure shall be calculated from the formula given below:

$$\text{Test pressure in kgf/cm}^2 = 1.3 \times \text{design pressure} \times \frac{f_1}{f_2}$$

where

f_1 = Allowable stress value of the material of construction at the test temperature, and

f_2 = Allowable stress value at design temperature.

Note — Freon oil separator shall be tested pneumatically only.

7. Dehydration — Oil separator shall be baked to remove moisture. Connection shall be sealed for shipment.

8. Marking

8.1 ISI Certification Marking — Details available with the Indian Standards Institution.